

# ARIZONA

## AEROSPACE AND DEFENSE INDUSTRY PROFILE

**A**rizona is home to one of the largest and most vibrant Aerospace and Defense clusters in the United States. These firms are engaged in a full range of activities including production of aircraft, aircraft parts, weaponry, navigation, guidance, optics and aeronautical systems. The aerospace and defense sector activity in Arizona is broad and deep, offering firms of all sizes unusual opportunities for growth. For example, it was recently reported that in 2004, Boeing alone spent \$1.2 billion with 186 Arizona companies in support of its operations within the state. Other industry leaders with substantial interests in Arizona include Honeywell, Raytheon, Northrop Grumman, General Dynamics C4 Systems, Orbital Sciences, Sargent Controls & Aerospace, Universal Avionics Systems, Lockheed Martin and Hamilton Sundstrand to name a few. All of these industry leaders work closely with numerous small and medium sized suppliers to support their operations.

Arizona has a long tradition of political and social support for the critical mission of aerospace and defense companies. Arizona's pro-business environment provides firms in this sector with a globally competitive cost structure fostered by targeted state incentives. In addition, Arizona offers a large and growing professional workforce fueled by outstanding university and community college programs. Several military installations in Arizona also contribute talent to the aerospace and defense industry.

Arizona's infrastructure assets, low operating costs, great flying weather, quality workforce and the commitment of state, local, and educational leaders to the aerospace and defense sector make Arizona an optimum location for firms considering a United States (U.S.) expansion or relocation.



### KEY FEATURES OF ARIZONA'S OPERATING ENVIRONMENT

Arizona offers a globally competitive operating cost structure. In addition to low payroll tax rates and labor costs, aerospace companies benefit from incentives like our Foreign Trade Zone and Military Re-Use Zone programs that can often provide the lowest effective tax rates available anywhere in the U.S.

### SECURE PHYSICAL ENVIRONMENT

Arizona is notable for the absence of catastrophic weather-related events. Recently, Phoenix ranked 2nd in the Risk and Insurance magazine annual study of the 10 safest cities in the U.S. This study evaluates the propensity of cities to have catastrophic events. The perils that are included in the analysis are hurricanes, earthquakes, terrorism, severe thunderstorms and winter storms. Although only metropolitan areas with populations of greater than one million people were included in the study, based on the study's criteria, virtually every city in Arizona could have produced a similar finding.

### GLOBALLY COMPETITIVE OPERATING COST STRUCTURE

An Arizona location can often provide the lowest effective tax rates available anywhere in the United States on your business investments. In fact, in many cases, overall business costs in Arizona are below average for the U.S. and are considerably below those of California. And, as a workforce benefit, Arizona costs of living are below competing centers for technology.



## **CORPORATE INCOME TAX STRUCTURE HIGHLY FAVORABLE TO INTERNATIONAL FIRMS**

Arizona corporate tax law is structured to provide benefits for firms located in Arizona and doing business outside of the state. Arizona is one of the few states without a “throw-back” provision, meaning that Arizona does not reclaim income from activity that was not taxed in other states or countries.

## **COMPETITIVE WAGES WITH LOW PAYROLL TAXES**

Arizona labor wage rates are 14% below the national average in the United States. Worker’s Compensation and Unemployment Insurance rates (payroll taxes) are lower than any other state in the Western and Southwestern regions of the U.S., and are lower than 92% of all jurisdictions in the U.S.

## **PRO-BUSINESS ENVIRONMENT**

For over 11 consecutive years, Arizona reduced taxes or passed fiscal legislation favorable to business. Other notable aspects of the tax code include no Corporate Franchise Tax, no Business Inventory Tax, no Income Tax on dividends from out-of-state subsidiaries and no Worldwide Unitary Tax.

## **INCENTIVES**

Arizona offers a number of incentives for high technology companies. The Arizona Department of Commerce (ADOC)

administers the state incentive programs including Enterprise Zones, Military Re-Use Zones and Arizona Job Training Grants, considered one of the best workforce training grant programs in the nation. In addition to state-based incentives, ADOC staff assists businesses in identifying Arizona communities that may offer other incentive assistance depending on the nature of the company and its project. And, our economic development professionals work to ensure all programs are effectively applied to benefit your business.

## **ARIZONA’S EDUCATIONAL ASSETS**

In today’s global economy, workforce strength depends on the critical connection between industry, education and workforce development. In Arizona, the relationship between businesses, universities, community colleges and primary school programs continues to be a magnet for aerospace and defense employers. Many higher education institutions here have broad aerospace and aerospace-related programs and all have an envied track record for working closely with Arizona employers to deliver programs designed to meet industry specific requirements.

## **HIGHER EDUCATION INSTITUTIONS**

Arizona State University (ASU) and the University of Arizona (UA) maintain highly regarded Departments of Aeronautical Management, Technology, Mechanical and Aerospace engineering that provide baccalaureate and graduate degree options. Embry-Riddle Aeronautical University, a leading aviation and aerospace training institution, has branches in Prescott, Phoenix, Mesa and Tucson. In 2005-2006, there were 2,157 bachelors, 758 masters and 274 doctorates awarded in aerospace and aerospace-related degrees from Arizona’s private and public universities.







The Arizona Space Grant Consortium (members include ASU, UA and Northern Arizona University) is a NASA sponsored program of outreach, training and research to encourage understanding of space exploration and provide a stream of talented professionals into the industry. In the 1999 10-year program review, Arizona's was ranked #2 of 52 Space Grant Programs nationwide.

## ARIZONA STATE UNIVERSITY PROGRAM SPECIFICS

### ALTITUDE CHAMBER

ASU's Polytechnic campus is one of three universities in the U.S. that offers Altitude Chamber training courses. The Aviation Physiology and Human Factors courses conducted there have been approved by Federal Aviation Administration. Altitude Chamber training is available to general aviation, commercial, corporate and government aircrew members.

### DEPARTMENT OF AERONAUTICAL MANAGEMENT TECHNOLOGY

The Department of Aeronautical Management Technology (AMT) offers undergraduate and comprehensive graduate programs that combine academic studies and professional flight and aviation training. Situated at ASU's Polytechnic campus and adjacent to Phoenix-Mesa Gateway Airport in Mesa, the AMT Department provides students with a solid foundation that prepares them for employment in major and regional airlines, general and corporate aviation, and the military.

### FLEXIBLE DISPLAY CENTER

The Flexible Display Center (FDC) was established in February 2004, when the U.S. Army awarded ASU a \$43.7 million, five-year cooperative agreement to develop flexible, low-power computer displays that can be continually refreshed with new data and carried in the field. At the MacroTechnology Works (MTW), FDC researchers work in close partnership with its many

industrial partners, which include Honeywell, General Dynamics, Kent Displays, Corning and the U.S. Display Consortium. Academic partners include Cornell University and the University of Texas.

### CENTER ON ADAPTIVE, INTELLIGENT, MATERIALS AND SYSTEMS (CAIMS)

CAIMS is a multidisciplinary effort center formed to research and exploit innovative and cutting edge technology for future "adaptive/intelligent" material and structural systems. ASU is the leading university in collaboration with John Hopkins University, Virginia Tech, and the University of Southern California. It also has industry and government involvement through Air Force Research Laboratory and Boeing Phantom Works.

### AIRWORTHINESS ASSURANCE CENTER OF EXCELLENCE

ASU is a member of the Federal Aviation Administration's (FAA) Airworthiness Assurance Center of Excellence. Dedicated to the entire range of aircraft safety research and the application of that research to solving current and predicted problems, the AACE is the focal point for the FAA's research and development (R&D) efforts to enhance aircraft safety.

### MARS AND SPACE RESEARCH

ASU is the only university to have created four scientific instruments that simultaneously send data back to earth from another planet: the thermal emission spectrometer (TES); the thermal emission imaging system (THEMIS); and two Mini Thermal Emission Spectrometers (Mini-TES) were part of the successful Mars Exploration Rover (MER) landings on the red planet in January 2004. In addition to MER, researchers in the School for Earth and Space Exploration are exploring the Moon and Mars as principal investigators and co-investigators on other spacecraft missions such as the Mars Global Surveyor, Mars Odyssey, Mars Express and Lunar Reconnaissance Orbiter.





## UNIVERSITY OF ARIZONA PROGRAM SPECIFICS

### DEPARTMENT OF AEROSPACE AND MECHANICAL ENGINEERING

The Department of Aerospace and Mechanical Engineering (AME) offers ABET-accredited undergraduate programs in aerospace engineering and mechanical engineering. AME also offers graduate programs in aerospace engineering and mechanical engineering. Research activities are concentrated in fluid mechanics and aerodynamics, multi-body dynamics and control, heat transfer, solid mechanics and composite materials, space technology, biomedical engineering and reliability. Some of the emerging areas of concentration include micro-electrical-mechanical systems (MEMS), nanotechnology and opto-mechanics.

### DECEPTION DETECTION LABORATORY

Through support from the Air Force Office of Scientific Research (AFOSR) and the Army Research Institute (ARI), the Center for the Management of Information (CMI) is currently developing the Deception Detection Laboratory (DDL) focused on conducting deception detection research at an unprecedented level of granularity and comprehensiveness.

### ARTIFICIAL INTELLIGENCE LABORATORY

As part of the Eller College of Management and Management Information Systems (MIS) Department, the Artificial Intelligence (AI) Lab is an internationally recognized research group in the areas of digital libraries, intelligent retrieval, collaborative computing, knowledge management, medical informatics, and security informatics. The AI Lab terrorism research projects aim to develop and evaluate scalable techniques for collecting and analyzing terrorism information, modeling terrorist behavior and terrorist networks, and disseminating information to the terrorized (victims and citizens) groups.

### PHOENIX MARS MISSION

The Phoenix MARS Mission at the UA College of Science, Lunar and Planetary Studies, has a collaborative approach to space exploration. As the very first of NASA's Mars Scout class, Phoenix combines legacy and innovation in a framework of a true partnership: government, academia, and industry. The project uses some of the world's most sophisticated and advanced space exploration technology.

### COLLEGE OF OPTICAL SCIENCES

The College of Optical Sciences is the world's premier optical institute, with outstanding faculty members, an international student body, pioneering research programs and close relationships with the optics industry. The College research programs encompass a broad set of technologies and techniques for exploiting the properties and applications of light and touches virtually every field of science and all modern industries including Fiber Optics, Lasers and Advanced Optical Materials, Nanotechnology, Optical Engineering and Testing, Quantum Nano-Optics of Semiconductors and many more.

### ARIZONA CENTER FOR INNOVATION

Located at the UA Science and Technology Park in Tucson, the Arizona Center for Innovation is a high tech incubator that focuses in important areas including aerospace, advanced composites, information tech and the life sciences.

### EMBRY-RIDDLE AERONAUTICAL UNIVERSITY

Embry-Riddle's Prescott campus, located in the heart of Arizona on 539 acres of high-altitude terrain, is famous for its world-class aviation programs. Embry-Riddle owes its strong reputation to its top-notch training facilities and Prescott's year-round flying weather. Some of the university's outstanding programs include flight, engineering, space physics, aviation business administration, global security and intelligence studies, computer science, and meteorology.

Embry-Riddle's exceptional facilities include a 48,000-square-foot Academic Complex, the King Engineering and Technology Center, the Robertson Aviation Safety Center, and the Robertson





Flight Simulation Center. The newest additions to the campus consist of the Aerospace Experimentation and Fabrication Building, as well as the Chris and Steven F. Udvar-Hazy Library and Learning Center.

Embry-Riddle also has branches in Phoenix, Mesa, and Tucson. Its online program, Embry-Riddle Worldwide, allows busy students to take online classes and interact with real instructors once a week on more than 130 campuses internationally.

Embry-Riddle is focused on the growing importance of international relations to the aerospace industry. For that reason, the university sponsors the Foreign Language Institute summer program to teach students either Arabic or Chinese languages.

### POST-SECONDARY INSTITUTIONS CONTRIBUTE SIGNIFICANTLY TO THE AEROSPACE INDUSTRY

**MARICOPA COMMUNITY COLLEGES (MCC)** is now the nation's largest community college system. MCC offers Associates degrees in Applied Science in aerospace manufacturing, aircraft construction and maintenance technology, aviation maintenance, airway science and machinist professions. Certificates of Completion are available in airframe maintenance, avionics, composite and flight technology, machinist, sheet metal structures technology and National Institute for Metalworking Skills Certification.

**Chandler Gilbert Community College** offers programs in aviation maintenance. These certificate/degree and university transfer programs have been designed for students to meet the aviation industry's need for well-prepared technicians. Technical specialties include aircraft maintenance, electronics/avionics and aircraft construction.

**Cochise College** is home to one of America's leading aviation training programs. For over 35 years, Cochise College has provided training to prepare students for careers as avionics technicians, airframe and powerplant mechanics and pilots. Cochise has placed graduates with all the major commercial airlines, the Federal Aviation Administration, the U.S. Border

Patrol and U.S. Customs, air freight services, and corporate aviation companies. Featured programs include Aviation Maintenance Technology and Avionics Technology.

**Pima Community College** offers a Start-to-Finish program focusing on Aviation Technology and Advanced Aviation Technology Certificate.

### ARIZONA'S WORKFORCE PIPELINE BEGINS AT THE PRIMARY SCHOOL LEVEL

#### CORPORATE AND PUBLIC EDUCATION COLLABORATION

Partnering with Boeing, Mesa K-12 Public Schools offer two child-sized, full motion airplane simulators and two helicopter trainers at the Lowell and Salk Flight Centers. The program touches over 7,000 students each year. Mesa Public Schools also offer the Boeing Math Academy which provides the math skills and the confidence students need to be successful in later studies and work.

#### HIGH SCHOOL VOCATIONAL TRAINING

The Arizona Department of Education, Career and Technical Education (ADE/CTE) offers a variety of programs at the high school level that are useful to high-tech employers. The programs include IT, Drafting and Design Technology, Electronics Technology and Industrial Manufacturing, and are offered in almost 200 schools touching almost 10,000 students annually.

#### PRIMARY EDUCATION INITIATIVES

Innovative programs at the university and community college level reach down to grades K-12 to develop interest and awareness in mathematics, the sciences and engineering. Central Arizona Community College hosts the Central Arizona Science Engineering, Mathematics and Aerospace Academy (SEMMAA). Offered as an after-school math and science enrichment program, SEMMAA is operating at participating schools in Casa Grande, Coolidge, Oracle, Sacaton, Toltec and the Mammoth/San Manuel Unified Schools districts. Working in conjunction with the NASA Aerospace Education Laboratory (AEL), the program currently reaches over 1,000 students.



## MILITARY

Arizona is home to 17 military installations providing employers with significant recruiting opportunities. The most notable active installations include The Barry M. Goldwater Range, Davis-Monthan Air Force Base, Fort Huachuca, Marine Corps Air Station Yuma, Luke Air Force Base and Yuma Proving Ground.

Arizona's historically strong defense industry has been growing at an unprecedented rate of more than \$1 billion a year since 2001. The value of defense contracts awarded to companies operating in the state rose from \$9.9 billion to \$11.1 billion, according to the Defense Department. The military contracts are a large and diverse lot, including 2,754 Arizona firms, according to governmentcontractswon.com. Many Arizona companies are leaders in areas such as UAVs, aircraft, missiles, space vehicles, battlefield communications and guidance systems. Arizona workers produce everything from Apache Longbow attack helicopters to the encrypted top-secret telephones used by the White House.

### ARIZONA: THE RIGHT CLIMATE TO GROW YOUR BUSINESS

Many of the largest aerospace and defense firms maintain significant operations within the state, but small- and medium-sized companies excel here, too.

- According to the Defense Department, more than 1,000 Arizona companies received contracts of \$25,000 or more last year.
- Phoenix-based Simula Inc., now part of Armor Holdings Inc., began operation in 1975 as a one-person company and is now the U.S. military's largest supplier of body armor.
- Increased growth for the larger aerospace and defense companies also presents potential for local companies that supply them.
- Raytheon Missile Systems accounts for more than one-third of Tucson's 30,000 manufacturing jobs. Raytheon has added 650 workers in Tucson since 2002 and watched sales climb.
- General Dynamics has added about 1,000 jobs over the past few years as a result of increased military business. The company has 4,700 employees in Arizona.
- Honeywell Aerospace has seen revenue grow from \$8.8 billion in 2002 to an estimated \$11 billion. It makes everything from airplane cockpit controls to aircraft engines at its Phoenix and Tempe facilities.

- Paragon Space Development Corporation is a woman-owned small business and a major supplier of Environmental Control and Life Support System (ECLSS) and subsystem design for the aerospace industry. It is also an expert in thermal control for spacecraft in orbit and during re-entry, as well as hyper-velocity aircraft.

### ARIZONA'S MILITARY OPERATIONS BY EMPLOYMENT (2000)

	Employment
Active Duty	21,390
Reserves	5,430
Rotational	1,162
Students	4,436
Civilian	13,544
Total	45,961

### IDEAL INFRASTRUCTURE FOR AEROSPACE, DEFENSE AND AVIATION

Arizona has 81 airports, three of which are international airports. The largest – Phoenix Sky Harbor International Airport – is served by 23 carriers, has over 1,400 arrivals and departures daily and moves approximately 855 tons of cargo daily. Tucson International Airport and Yuma International Airport add an additional 200 daily flights. In addition, Metro-Phoenix offers location opportunities on two former military bases. The largest is Phoenix-Mesa Gateway Airport which has three runways, the longest of which is 10,440 ft. Jet capable airports also exist in dozens of smaller cities and towns throughout the state.

### DIVERSE, TALENTED AND GROWING WORKFORCE

Arizona builds its workforce in partnership with industry, emphasizing bioscience, advanced communications, information technology, aerospace and defense, environmental technologies and advanced manufacturing.





## BUSINESS ASSISTANCE

### LET THE ARIZONA DEPARTMENT OF COMMERCE HELP YOU

The goal of the Arizona Department of Commerce is to provide you with the support services needed to properly evaluate the business opportunities in Arizona. We provide any assistance required to make the establishment of operations here as easy as possible. Our experienced business professionals – Project Managers – serve as a single point of contact for you to explore opportunities anywhere in the state. Allow us to assist you with site selection, custom research including comparative analyses of real estate, utility, transportation and tax costs, access to regulatory authorities, clarification of governmental regulations and more. Call today to learn more about the advantages of Arizona.



### **ARIZONA DEPARTMENT OF COMMERCE**

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Arizona is the fastest growing state in the U.S. with a median age of just 34.3 years. The Greater Phoenix population alone increased more than 54% between 1990 and 2003, outpacing the U.S. rate of just 15%. Arizona's sustained robust growth results directly from the attractive advantages it offers residents and businesses.

### FINDING YOUR WORKFORCE

The Arizona Workforce Connection (AWC) is the state's streamlined workforce development system – bringing together all of Arizona's workforce development partners to provide businesses with comprehensive and coordinated services, representing more than \$270 million in federal and state programs.

Arizona boasts large numbers of people studying in diverse settings; 150 private postsecondary educational institutions train 30% of Arizona's workforce, equipping more than 110,000 students each year with leading-edge training, from certificate programs to PhDs. More than 3,000 apprentices currently participate in Arizona's 126 registered apprenticeship programs in a wide number of industries.

Aerospace and defense clusters exist around the state along with the workforce to support them. Metro Phoenix alone is home to nearly 300 aerospace and defense companies with more than 40,000 employees. In Southern Arizona, primarily in the cities of Tucson and Sierra Vista, there are approximately 200 aerospace and defense-related firms which employ over 25,000 professionals. Significant aerospace and defense cluster activity is also present in smaller communities like Prescott, Prescott Valley and Yuma.

### RELIABLE UTILITIES AND ABUNDANT RESOURCES

Electricity in Arizona is plentiful, dependable, affordable and produced from a variety of sources. Arizona's utility portfolio combines nuclear, coal, hydro and gas. Statewide power companies, rural electric cooperatives and municipal utility systems provide plentiful supplies and competitive pricing.

Arizona leads the nation in water resource planning and water management efforts. Arizona's water supply comes from a triad of surface water retained in reservoirs, Colorado River water through the Central Arizona Project and local ground water aquifers, making vast amounts of water available to Arizona companies and communities.

### ARIZONA SOARS

- Arizona has demonstrated a longstanding and unwavering commitment to support the growth of our aerospace and defense companies. Most recently, the State of Arizona established the Arizona Aerospace and Defense Commission. The Commission reports to the Governor and is comprised of private sector aerospace and defense executives, university representatives and legislative officials.
- Embraer, one of the world's leading manufacturers of commercial and corporate jets, has broken ground at Phoenix-Mesa Gateway Airport in Mesa for an Embraer-owned executive jet service center to service Embraer-manufactured executive aircraft. Phoenix-Mesa Gateway will be home to one of four Embraer-owned executive jet service centers in the United States. When fully operational, the new facility will create up to 60 new jobs and a total capital investment of approximately \$11 million.
- Cessna Aircraft Company has also broken ground at Phoenix-Mesa Gateway Airport in Mesa to build a new company owned 100,00 square-foot Citation Service Center to service their large fleet of Citation jets. The facility will open in early 2009.
- Honeywell landed a large piece of the Orion Crew Exploration Vehicle development program set to carry U.S. astronauts back to the moon in 2020. The program will create more than 500 new jobs in Phoenix.
- Fortune 50 Company Lockheed Martin expanded to Prescott Valley recently after taking over the former Federal Aviation Administration's Automated Flight Service Stations. The company chose to stay in the region and grow its operations by building a new facility and creating new jobs.